

Notice of Allowability

Application No.

09/829,960

Examiner

Yubin Hung

Applicant(s)

SHEFER, MOREDECHAI

Art Unit

2625

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment filed Sep. 13, 2004.
2. ☒ The allowed claim(s) is/are 1,6,7,9,10 and 13-19.
3. ☒ The drawings filed on 11 April 2001 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

Response to Amendment/Arguments

1. This action is in response to the after-final amendment filed on September 13, 2004.
2. In view of applicant's amendment, and the agreed-to examiner's amendment (see below), the objection to the specification has been withdrawn.
3. Claims 2-5, 8, 11 and 12 have been canceled, claim 19 has been added.
4. Claims 1, 6, 7, 9, 10 and 13-19, with examiner's amendment indicated below, have been allowed.

EXAMINER'S AMENDMENT

5. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Dr. Alan Rosenthal on December 15, 2004.

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6. The application has been amended as follows:

Replace claims 1, 13-16 and 19 with the replacement claims listed in Appendix A.

Contact Information

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yubin Hung whose telephone number is (703) 305-1896. The examiner can normally be reached on 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



**BHAVESH M. MEHTA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600**

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Yubin Hung
Patent Examiner
December 15, 2004

APPENDIX A

1. A high-speed digital enhancement method for gray-scale images, comprising:
 - a. computing a normalized light dynamic range compressed image;
 - b. computing a normalized dark dynamic range compressed image; and
 - c. computing a balanced dynamic range compressed image, using said normalized light and dark dynamic range compressed images;

wherein said step of computing a normalized light dynamic range compression image further includes computing a light dynamic range compressed image as

$$I_{pos}(i, j) = \frac{N(i, j)}{K + (W * N)(i, j)}$$

wherein $I_{pos}(i, j)$ represents said light dynamic range compressed image, $N(i, j)$ represents one of the gray-scale images, K is a positive scalar variable, W is an averaging kernel and $*$ represents convolution.

13. A method of enhancing an input image, comprising the steps of:
 - (a) computing a norm $N(i, j)$ of each pixel of the input image; and
 - (b) computing a light dynamic range compressed image, each pixel whereof is

$$I_{pos}(i, j) = \frac{N(i, j)}{K + (W * N)(i, j)}$$

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wherein K is a positive scalar variable, W is an averaging kernel, N is a matrix of said norms in a neighborhood of said each pixel and $*$ represents convolution.

14. The method of claim 13, wherein said light dynamic range compressed image is computed using a lookup table for $\frac{1}{K + (W * N)(i, j)}$.

15. The method of claim 13, wherein said light dynamic range compressed image is computed using a lookup table for $\frac{N(i, j)}{K + (W * N)(i, j)}$.

16. The method of claim 13, further comprising the step of:

(c) computing a dark dynamic range compressed image, each pixel whereof is

$$I_{neg}(i, j) = 1 - \frac{(FS - N)(i, j)}{K + (W * (FS - N))(i, j)}$$

wherein FS is a full-scale dynamic range matrix, K is a positive scalar variable, W is an averaging kernel, $(FS - N)$ is a matrix of a difference between FS and said norms in a neighborhood of said each pixel, and $*$ represents convolution.

19. A high-speed digital enhancement method for gray-scale images, comprising:

a. computing a normalized light dynamic range compressed image;

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b. computing a normalized dark dynamic range compressed image;

and

c. computing a balanced dynamic range compressed image, using

said normalized light and dark dynamic range compressed images;

wherein said step of computing a normalized dark dynamic range

compressed image further includes computing a dark dynamic range

compressed image as

$$I_{neg}(i, j) = 1 - \frac{(FS - N)(i, j)}{K + (W * (FS - N))(i, j)}$$

wherein $I_{neg}(i, j)$ represents said dark dynamic range compressed image, $N(i, j)$

represents one of the gray-scale images, FS is a matrix, identical in dimension to

N , that represents a dynamic range of said one gray-scale image; K is a positive

scalar variable, W is an averaging kernel and $*$ represents convolution.